

QUESTION 1:

Simplify

1. 
$$\frac{(2x^3)^4 \times (3x^4)^3}{\sqrt{64x^{12}}}$$

2. 
$$\frac{3-x}{5} - \frac{2x-3}{2}$$

3. 
$$(2x+y)^3 - (2x-y)^3$$

4. 
$$\frac{5^{n+1} - 5^n}{4}$$

QUESTION 2:Solve for  $x$ :

1.  $6x^2 = 12x$

2.  $(3x-1)^2 = 16$

3. 
$$\left. \begin{array}{l} x+y=3 \\ x^2+y^2=9 \end{array} \right\}$$

4.  $-7 < 3-2x \leq 11$

5.  $2x^2 - 5x + 1 = 0$  by completing the square

QUESTION 3:

(i) Factor (a)  $25x^2 - 100y^2$  (b)  $xy - x + 1 - y$

(c)  $9x^2 - 6xy + y^2 - 4$

(ii) Simplify 
$$\frac{3}{x^2-1} - \frac{2}{(x^2-x)^2}$$

QUESTION 4:(i) Prove that  $0.3\bar{17}$  is a rational number.(ii) WITHOUT calculator, show how to arrange the following in ascending order:  $3\sqrt{5}$ ,  $2\sqrt{10}$ ,  $4\sqrt{3}$ 

(iii) Find  $x, y$  if 
$$\frac{3-\sqrt{2}}{3+\sqrt{2}} = x + y\sqrt{2}$$

QUESTION 5:

Sketch each of the following and state

(a) whether a function or relation (b) DOMAIN (c) R

- (i)  $y = x^2 - 1$  (ii)  $x + y = 4$  (iii)  $x^2 + y^2 = 9$  (iv)  $xy = 2$  (v)  $x^2$

QUESTION 6:

(i) If  $f(x) = 3 - x$  and  $g(x) = x^2 - 1$  find

- (a)  $f(-1)$  (b)  $x$  when  $f(x) = 2$  (c)  $f\{g(x)\}$  (d)  $g\{f(x)\}$

(ii) If  $f(x) = 3x^2 - 2x$ , simplify  $\frac{f(x+h) - f(x-h)}{2h}$

Yr 11 EXT Quiz

Question 1

$$(1) \frac{(2n^3)^4 \times (3n^4)^3}{\sqrt{64n^{12}}} = \frac{16n^{12} \times 27n^{12}}{8n^6} = 54n^{18} \checkmark \checkmark$$

$$2) \frac{3-n}{5} - \frac{2n-3}{2} = 0 \Rightarrow \frac{-6-2n-10n+15}{10} = \frac{21-12n}{10} \checkmark$$

$$(3) = [(2x+y) - (2x-y)] \times [(2x+y)^2 + (2x+y)(2x-y) + (2x-y)^2] \\ = (2y) [4x^2 + 4xy + y^2 + 4x^2 - y^2 + 4x^2 - 4xy + y^2] \checkmark \checkmark \\ = (2y)(12x^2 + y^2)$$

$$4) \frac{5^{n+1} - 5^n}{4} = \frac{5^n(5-1)}{4} = \frac{5^n(4)}{4} = 5^n \checkmark \text{ good}$$

Question 2

$$\rightarrow 6x^2 = 12x \Rightarrow 6x^2 - 12x \geq 0 \Rightarrow 6x(x-2) \geq 0 \\ \therefore x = 0 \text{ or } 2 \checkmark$$

$$2) (3x-1)^2 = 16 \Rightarrow 3x-1 = \pm 4 \\ \therefore x = \frac{5}{3} \text{ or } x = -1 \checkmark$$

$$(5) x+y=3 \rightarrow x=3-y \\ x^2+y^2=9 \\ (3-y)^2+y^2=9 \\ 9-6y+y^2+y^2=9 \\ -6y+2y^2=0 \\ -2y(3+y)=0 \checkmark \\ \therefore y=0 \text{ or } y=-3 \checkmark$$

$$(6) 7 < 3-2x \leq 11 \Rightarrow -4 < -2x \leq 4 \Rightarrow 2 < x \leq -2 \checkmark$$

you divided throughout by a negative number

$$5) 2x^2 - 5x + 1 = 0$$

$$x^2 - \frac{5}{2}x + \frac{1}{2} = 0 \Rightarrow \frac{1}{2} \pm \frac{\sqrt{25}}{16} \checkmark$$

$$(x - \frac{5}{4})^2 = \frac{17}{16} \checkmark$$

$$x - \frac{5}{4} = \pm \frac{\sqrt{17}}{4}$$

$$x = \frac{5}{4} \pm \frac{\sqrt{17}}{4} \checkmark$$

$$x = \frac{5 \pm \sqrt{17}}{4} \checkmark$$

good

question 3

Take out any common factors first!  
= 25(x^2 - 4y^2) =

$$i) a. 25x^2 - 100y^2 = (5x-10y)(5x+10y) = 25(x-2y)(x+2y)$$

$$b. xy - x + 1 - y = x(y-1) - (y-1) = (x-1)(y-1) \checkmark$$

$$c. 4x^2 - 4xy + y^2 - 4 = (2x-y)^2 - 4 \\ = (2x-y+2)(2x-y-2) \checkmark \text{ good}$$

(ii)

$$\frac{3}{x^2-1} - \frac{2}{(x^2-x)^2}$$

$$= \frac{3(x-1)(x+1) - 2x^2}{(x^2-1)^2}$$

$$= \frac{3(x^2(x-1)) - 2(x+1)}{(x^2-1)^2}$$

$$= \frac{3x^3 - 3x^2 - 2x - 2}{x^2(x+1)(x-1)^2} \checkmark \text{ finished}$$

$$= \frac{3x^3 - 3x^2 - 2x - 2}{x^2(x+1)(x-1)^2}$$

$$\begin{array}{l} - \frac{3x^3 + 3x^2 - 1}{x^2(x+1)(x-1)^2} \text{ NO} \\ - \frac{x^2(x+1)(x-1)^2}{x^2(x+1)(x-1)^2} \\ - \frac{(3x^2-1)(x-1)}{x^2(x+1)(x-1)^2} \\ - \frac{x^2(x+1)(x-1)^2}{x^2(x+1)(x-1)^2} \\ - \frac{3x^2-1}{x^2(x+1)(x-1)^2} \\ - \frac{x^2(x+1)(x-1)^2}{x^2(x+1)(x-1)^2} \end{array}$$

Question 4

i)  $0.317 = \pi$

$10\pi = 31.7$

$1000\pi = 317.17$

$440\pi = 314$

$\pi = \frac{314}{440} = \frac{157}{220}$

$\therefore 0.317 = \frac{157}{495}$

ii)  $3\sqrt{5}, 2\sqrt{10}, 4\sqrt{3}$

$\sqrt{45}, \sqrt{40}, \sqrt{48}$

$2\sqrt{10}, 3\sqrt{5}, 4\sqrt{3}$

ascending

(iii)  $\frac{3-\sqrt{2}}{3+\sqrt{2}} = x+y\sqrt{2}$

$\frac{3-\sqrt{2}}{3+\sqrt{2}} \times \frac{3-\sqrt{2}}{3-\sqrt{2}} = \frac{9-6\sqrt{2}+2}{9-2} = \frac{11-6\sqrt{2}}{7}$

$\therefore x = \frac{11}{7}, y = -\frac{6}{7}$

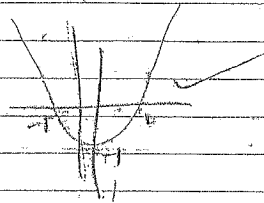
Question 5

i)  $y = x^2 - 1$

a) function

b)  $D = x$ : all real  $x$

c)  $R = y$ :  $y \geq -1$

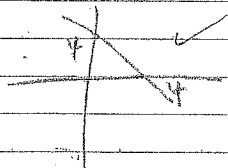


ii)  $x+y=4$

a) function

b)  $D = x$ : all real no.'s

c)  $f = y$ : all real no.'s

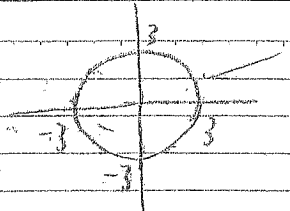


iii)  $x^2 + y^2 = 9$

a) relation

b)  $D = x$ :  $-3 \leq x \leq 3$

c)  $R = y$ :  $-3 \leq y \leq 3$



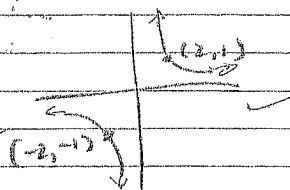
iv)  $xy = 2$

$y = \frac{2}{x}$

a) function

b)  $D = x$ :  $x \in \mathbb{R}, x \neq 0$

c)  $R = y$ : all real  $y, y \neq 0$



Question 6

i)  $f(x) = 3-x$  and  $g(x) = x^2 - 1$

a)  $f(-1) = 3 - (-1) = 4$

b)  $g(x) = 2$

$= 4$

$x = \pm\sqrt{2}$

c)  $f(g(x)) = 3 - (x^2 - 1) = 3 - x^2 + 1 = 4 - x^2 = (2-x)(2+x)$

d)  $g(f(x)) =$

ii)  $f(x) = 3x^2 - 2x$

$f(x+h) = 3(x+h)^2 - 2(x+h)$

$f(x-h) = 3(x-h)^2 - 2(x-h)$

$3x^2 + 6xh + 3h^2 - 2x - 2h - (3x^2 - 6xh + 3h^2 - 2x + 2h)$

$3x^2 + 6xh + 3h^2 - 2x - 2h - 3x^2 + 6xh - 3h^2 + 2x - 2h$

$\frac{12xh - 4h}{2h} = \frac{2h(3x-1)}{2h}$

$= 2(3x-1) = 6x-2$